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STANFORD UNIVERSITY SCHOOL OF MEDICINE
Department of Genetics

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Dear Dr. Morgenstern,

This is in further reply to your letter of

6/12

I was very much interested to read your 13 points. The most creative writing in any science, it seems to me, is that which exposes very clearly the fundamental unsolved problems. Yet one so rarely sees this and instead one is likely to be immersed in continual confusion as writers seek to evade rather than expose the fundamental difficulties. In many writings one may see a footnote that the economist has only certain variables under control or at his disposal. Yet when policy recommendations are being formulated and defended it is precisely these political constraints that need to be headlined.

I find myself in something of a dilemma in contrasting the critical outlook of your 13 points with your implied suggestion that conventional economic arguments might be persuasive with Dr. Shultz. It seems to me there is a profound connection between the insufficiency of economic theory as you have criticized it and the policy errors that are being made with respect to federal support of the development of new knowledge and technology. I have looked for and read every cost benefit analysis of research that I could find, and I am gravely uneasy about each one of them with respect to the crudity of the approximations that enter on both the cost and benefit side. For an example, I enclose a copy of an article by Weisbrod, 1971, which claims to be a unique economic analysis of a case history in medical research. I do not think it really adds very much to the briefer and admittedly more superficial cases that are included in the FASEB report that I sent you.

The absurdity of Weisbrod's argument can be epitomized by his setting a value of \$1350 per case of poliomyelitis prevented! -- an assessment of economic value that might appear to be a parody of economic analysis. I am not sure that I can suggest any practical alternative for empirical measurement of the marginal value of prevention per case. I am not very happy with efforts to date which attempt to relate marginal values to actuarial stakes, as I am sure these are not nearly as linear as our simple theory would demand. (Or to put it a little differently, that the risk/aversion aspects include more than the stake, freedom from worry, from the cost of seeking further information, from the cost of anticipating future bargaining and other externalities). It is notable that Weisbrod can make a very good case for a substantial rate of return on investment even with this ludicrous

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evaluation on disease prevention. On the other hand, to study the marginal cost of research on polio is not very useful for trying to build a case for the overall support of health research! A comparison of the marginal costs, and commensurate benefits on some uniform basis, would of course be a reasonable first order strategy for deciding upon alternative areas of research investment which is a rather different question, I believe, than you intend to bring to Dr. Shultz' attention.

So many discussions about the "value of life" seem to be infected with inappropriate normative considerations, but I am left rather astonished that economists generally do not adopt an approach consistent with other areas -- what is the consumer willing to pay for the product? Mishan in his paper in the Journal of Political Economy, July, 1971, Vol. 79:687-705, "Evaluation of Life and Limb: A Theoretical Approach". What I wanted to say is that Mishan in that article has done a much better job of examining different theoretical formulations of evaluating life and health.

But of course the whole matter becomes now much more a question of politics than of economics, broadly considered.

Anyone working in experimental biology will tell you how impossible it is to segregate expenditures that should be allocated as the marginal cost of doing polio research. These, in fact, are a small part of the total effort that was necessary to reach a successful conclusion. And of course the converse is also true, as Weisbrod himself points out with respect to Watson having been supported by a polio fellowship. (I well remember Luria's exasperation when Watson totally disregarded all of the formalities with respect to changing the laboratory in which he wanted to work -- some of this is recounted in Watson's book.)

The different elements of cost and of benefit are also thoroughly interdigitated that I despair of taking anything other than an institutional approach to the examination of the policies of support of research. We will either be the kind of country in which research, technology, and economic growth based on these inputs will be able to flourish or we will not. For many, many basic research projects the real value to the national economy will be their role in education, in sharpening the minds of researchers, teachers and students than in the direct flow of benefits from the actual knowledges obtained. That is to say the process far outweighs the product in terms of its social value. What is the value of the key-stone of an arch?

All of the above notwithstanding, I am happy to give you whatever support I can in your mission vis-a-vis Dr. Shultz, and I hope you will tell me if there is anything more that I can add.

It may be particular important to know just what questions Dr. Shultz has on his mind for himself as he reviews the policies in question. If you can give me any feedback on this point, perhaps my own responses in the future might be more intelligently directed.

Sincerely yours,

Joshua Lederberg
Professor of Genetics

Enclosures